

Anesthesia of the 5th Nerve and its Branches by the Extra-Oral Approach

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Anesthesia by means of the extra-oral approach may at times be most important. A thorough understanding of the field of anesthesia should include the ability of the dentist anesthesiologist to perform these procedures.

Indications for Extra-Oral Blocks

1. When there is an infection present intraorally in the area of injection.
2. When trismus or ankylosis make the intraoral approach difficult or impossible.
3. When a large area is to be anesthetized by using a minimum of anesthetic solution.
4. For diagnostic and therapeutic purposes.
5. When attempts to secure anesthesia by the intraoral approach have proved ineffective.
6. To relieve intractable pain in the jaws due to any condition.

Contraindications

1. The presence of infection in the area of needle insertion or when aseptic conditions are unable to be obtained.
2. When landmarks are difficult to locate.
3. Usually in children.

Procedure

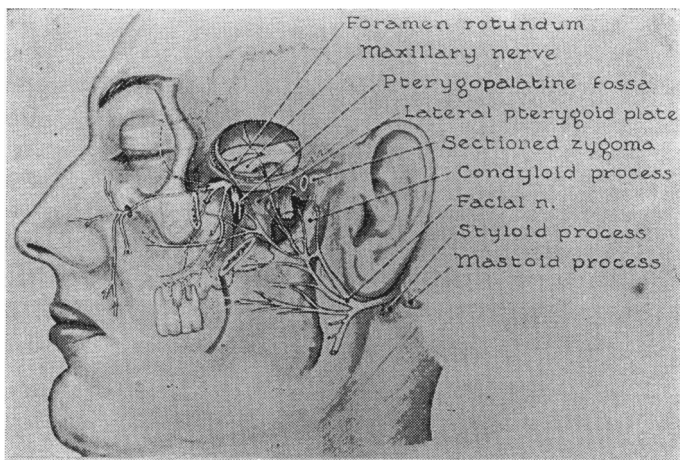
All extra-oral blocks should be performed using aseptic technics. The operator should complete a surgical scrub and use sterile gloves. The area to be injected should be prepared and draped. The sterility of all armamentarium should be assured.

A thorough understanding of the anatomy of the head and neck is indispensable to a successful result. The anesthesiologist should review this field again for a complete understanding of the neuro anatomy, landmarks, and related structures involved in the technic of extra-oral nerve blocks. (See Figs. 1, 2 and 3.)

Armamentarium

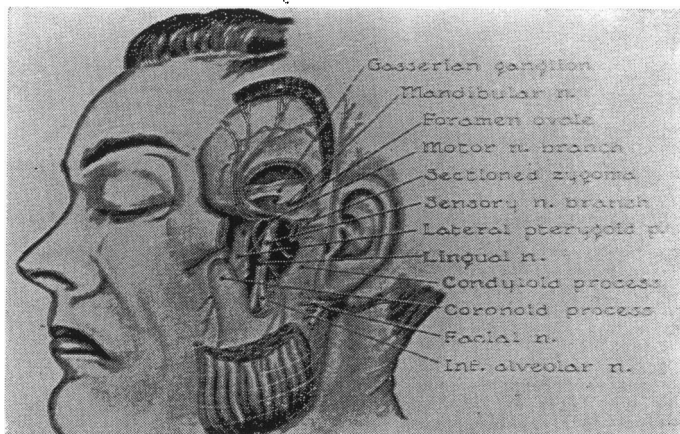
1. Two 3/4" 25 gauge Luer-Lok needles (for skin wheal.)
2. Two 8 cm. 22 gauge Luer-Lok needles with a short bevel (for maxillary and mandibular nerve blocks.)
3. Two 5 cm. 22 gauge Luer-Lok needles with short bevel (for infraorbital and mental blocks.)
4. One 5 cm. Luer-Lok syringe (preferably with finger rings.)
5. One stainless steel prep cup.
6. One 2 oz. medicine glass.

7. Four sterile towels, four sterile towel clips.
8. Six sterile 4" x 4" sponges.
9. One sponge forceps.
10. One metal centimeter rule.
11. Rubber or cork markers.
12. College pliers (for adjustment of markers.)
13. Anesthetic solution of choice. (1 to 12 in sterile tray. Anesthetic solution may be in multiple dose vial.)



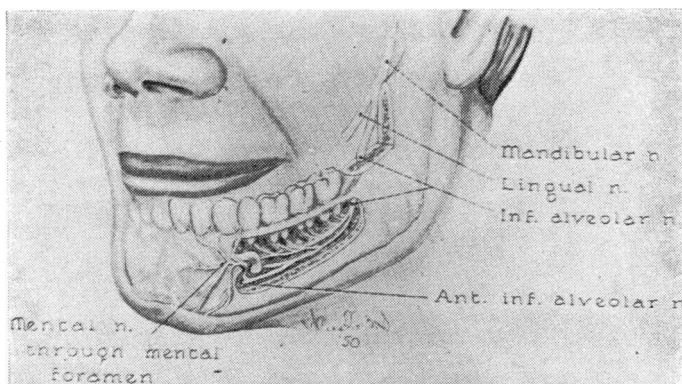
(From Moore, Daniel C., "Regional Block," 2nd. ed., 1957. Courtesy of Charles C. Thomas, Publisher, Springfield, Illinois)

Fig. 1. Diagram of the Gasserian Ganglion, the maxillary nerve and its branches.



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Fig. 2. Diagram of the Gasserian Ganglion, the mandibular nerve and its branches.



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Fig. 3. Diagram of the inferior alveolar nerve and its branches.

Technics

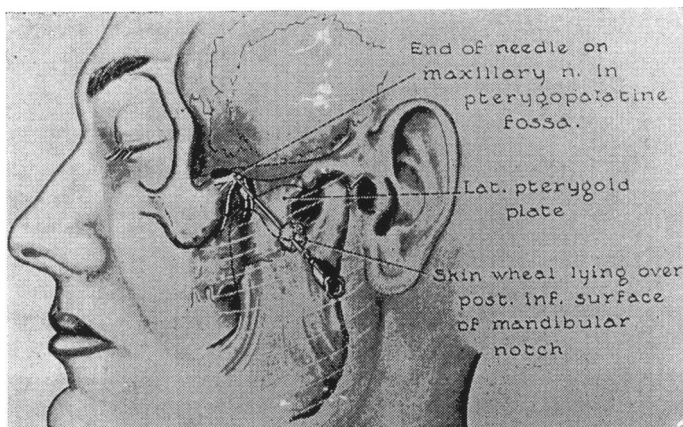
1. Maxillary Nerve Block

Landmarks

1. The midpoint of the zygomatic arch (sigmoid notch.)
2. The mandibular notch of the ramus of the mandible.
3. The lateral pterygoid plate.

Palpate the external bony landmark which is the sigmoid notch of the zygomatic arch. Then have the patient open and close his mouth as the operator holds his finger in contact with the sigmoid notch. The head of the condyle should be plainly felt moving into the area. A skin wheal should be raised at this predetermined site. A needle inserted perpendicular to the sagittal plane should pass through the mandibular notch just inferior to the midpoint of the zygomatic arch. Place a marker on an 8 cm. needle at the 4.5 cm. position. This needle may be used with or without the syringe attached. Using a pen grasp

insert the needle through the skin wheal perpendicular to the median sagittal plane and advance it slowly until it strikes the lateral pterygoid plate. This should occur before the marker reaches the skin surface. Adjust the marker so that it is 1 cm. from the skin surface. Withdraw the needle until its point only is in subcutaneous tissue. Redirect it anteriorly and superiorly so that it is pointed toward the apex of the opposite orbit. Insert the needle until the marker reaches the skin surface. The point of the needle should now lie within the pterygopalatine fossa. If bone is contacted prematurely the needle point is either still on the lateral pterygoid plate or anterior to the pterygomaxillary fissure on the maxilla. Before withdrawing the needle to redirect it turn the bevel toward each of these bones and exert slight pressure. If this is done the needle may slide through the pterygomaxillary fissure and into



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Fig. 4. Illustrating the final position of the needle when executing a block of the Second Division. The first position would be at right angles to the saggittal plane striking the lateral pterygoid plate.

the pterygopalatine fossa. Here aspiration should be carried out to ensure that a blood vessel has not been entered. If not, 2 to 3 ml. of anesthetic solution is slowly deposited.

While executing this block the needle passes through the following structures:

1. Skin
2. Subcutaneous tissue
3. Masseter muscle
4. Mandibular notch.
5. The external pterygoid muscle

While in contact with the lateral pterygoid plate important structures near the needle are:

1. Superiorly, the base of the skull.
2. The internal maxillary artery crosses inferiorly and curves up anterior to it entering the lower part of the pterygomaxillary fissure.

3. Temporal vessels from the internal maxillary artery may lie on either side of it.
4. Superficially, the transverse facial artery may lie above or below it.
5. Posteriorly, the foramen ovale through which passes the mandibular nerve, and posterior to that the foramen spinosum through which passes the middle meningeal artery.
6. Anteriorly, the pterygomaxillary fissure through which the needle may pass into the pterygopalatine fossa.

When an extra-oral maxillary block is successfully performed the following structures are anesthetized:

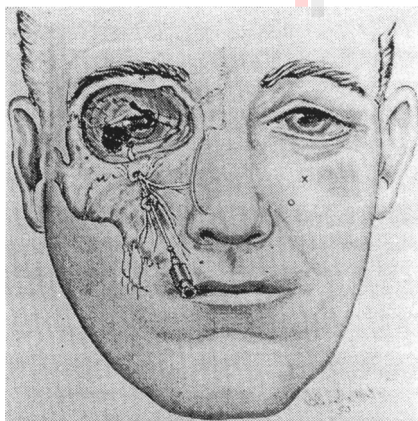
1. The anterior temporal and zygomatic regions.
2. Lower eyelid.

3. The side of the nose.
4. Anterior cheek.
5. Upper lip.
6. Maxillary teeth.
7. The maxillary alveolar bone and overlying structures.
8. The hard and soft palate.
9. The tonsil.
10. Part of the pharynx.
11. The nasal septum and floor of the nose.
12. Posterior lateral nasal mucosa and turbinate bones.

2. Infraorbital Block (Middle and Anterior Superior Alveolar Nerves)

Landmarks

1. The pupil of the eye when the patient is looking straight forward.
2. The infraorbital ridge.
3. The infraorbital notch.
4. The infraorbital depression.



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Fig. 5. Illustrates the needle position when executing an infra-orbital block.

The infraorbital foramen is located by palpating the infra-orbital ridge to the infraorbital notch. This should be directly below the pupil of the eye. By moving the finger downward about $\frac{1}{2}$ to 1 cm. the infraorbital depression is located. The infraorbital foramen lies in this area; its position on the face should be marked. As the direction of the infraorbital canal is downward and medially, another mark about $\frac{1}{4}$ " below and $\frac{1}{4}$ " medial to the foramen is made and a skin wheal of local anesthetic raised at this second mark. A 5 cm. 22 gauge needle is now inserted through the wheal and directed upward and laterally so that its point contacts bone under the first mark. A 5 cm. 22 gauge needle is now inserted through the wheal and directed upward and laterally so that the point contacts under the first mark. With a gently probing motion locate the foramen. The needle is advanced $\frac{1}{8}$ " into the canal and, after carefully aspirating, 1 to 2 cc. anesthetic solution is injected.

While executing this block the needle passes through the following structures:

1. Skin
2. Subcutaneous tissue
3. Quadrature labii superioris muscle

While in position for this injection important structures near the needle are:

1. The facial artery and vein which may lie on either side of the needle as they are very tortuous.

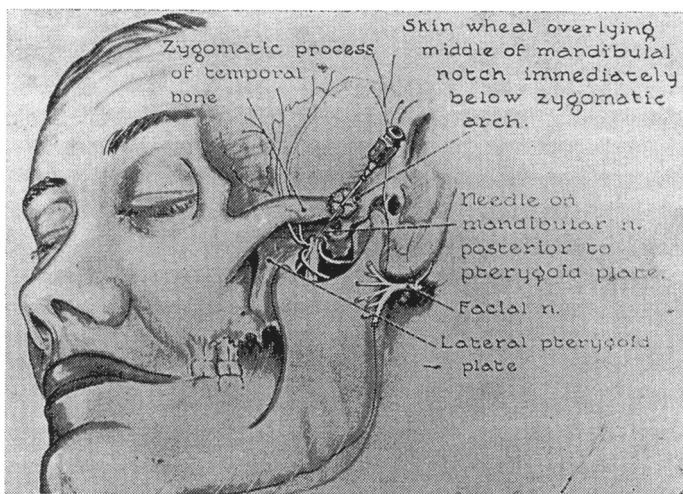
When an extra-oral infraorbital block is successfully performed the following structures will be anesthetized:

1. The upper anterior teeth and gingiva as far back as the second bicuspid.
2. The upper lip, cheek and oral mucosa.
3. Part of the side of the nose.
4. The lower eyelid.

3. The Mandibular Block

The technic for blocking this nerve is identical to that for blocking the maxillary nerve up to the

point where the needle contacts the lateral pterygoid plate. When this occurs the marker is adjusted so that it is 1 cm. from the skin surface. Withdraw the needle until its point is in subcutaneous tissue only. Redirect it slightly posteriorly and superiorly and carefully insert it again until either the marker is flush with the skin, or the point of the needle stimulates the mandibular nerve as is evidenced by the patient's reaction. If bone is contacted prematurely the needle is either still striking the lateral pterygoid plate, or the base of the skull. The bevel should be turned toward the base of the skull and gentle pressure exerted. If it does not slide into its proper position



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Fig. 6. Illustrates the final needle position when executing a Third Division block. The first position would be as for executing a Second Division block as outlined in Figure 4.

near the foramen ovale, the needle position should be checked, withdrawn, and the procedure repeated. When the needle is in place the procedure of aspiration should be carefully carried out and 2 to 3 cc. of anesthetic solution deposited.

The structures through which the needle passes and the structures adjacent to the needle when in contact with the lateral pterygoid plate are the same as those given in the maxillary nerve block.

When an extra-oral mandibular block is successfully performed the following structures will be anesthetized:

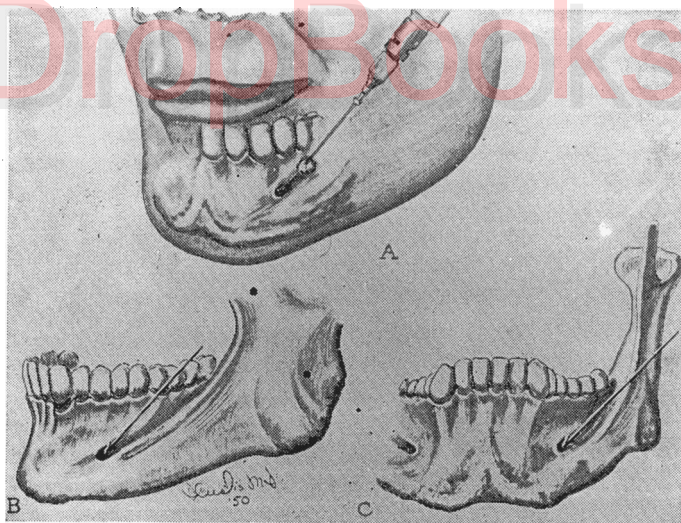
1. The temporal region.
2. The auricle of the ear.
3. The external auditory meatus.
4. The temporomandibular joint.

5. The salivary glands.
6. The anterior two-thirds of the tongue.
7. The floor of the mouth.
8. The mandible.
9. The lower teeth, gingiva and buccal mucosa.
10. The lower portion of the face (except at the angle of the jaw) and the lower lip.

4. The Mental and Incisive Nerve Block

Landmarks

1. The bicuspid teeth.
2. Lower border of the mandible.
3. The supraorbital notch.
4. The infraorbital notch.
5. The pupil of the eye when the patient is looking straight forward.



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Fig. 7. "A" illustrates the needle position when executing a block of the Mental and incisive nerves. "B" and "C" show the angulation with the horizontal and sagittal planes.

To locate the mental foramen an imaginary line may be drawn through the supraorbital notch, the pupil of the eye and the infraorbital notch. An extension of this line downward should pass through the mental foramen. A point on this line midway between the lower border of the mandible and the gingival margin should be estimated and marked. This point should lie over the mental foramen. If the lower teeth are present it should be located directly below the second bicuspid. A second point $\frac{1}{4}$ " above and $\frac{1}{4}$ " behind the first should be marked as the mental foramen opens distally and superiorly. A skin wheal is made at this point. A 5 cm. 22 gauge needle is inserted through the skin wheal and directed downward anteriorly and medially until it contacts bone under the first mark. With a gently probing motion the foramen is located, entered, and after aspirating, 1 to 2 cc. of anesthetic solution is injected.

While executing this block the needle passes through the following structures:

1. Skin
2. Subcutaneous tissue
3. Triangularis muscle

When an extra-oral mental block is successfully performed the following structures will be anesthetized:

1. The chin
2. The lower lip and mucous membrane

3. The mandibular teeth and buccal gingiva as far back as the second bicuspid.

Complications

1. Paralysis of branches of the facial nerve. This may be due to an excessive amount of anesthetic solution, or to some solution escaping the needle as it is being inserted or withdrawn. It is of no consequence and will resolve as the block dissipates.
2. Puncture of the wall of the pharynx. This will rarely happen if markers are used as directed. It is not serious except that it contaminates the needle as it passes through the wall of the pharynx. Damage to the eustachian tube may occur.
3. Needle point entering the orbital cavity. This again should not occur if the operator uses a marker as directed in the case of the maxillary nerve block, or the needle does not enter the infra-orbital foramen more than $\frac{1}{8}$ " in the case of the infraorbital block. If the patient complains of pain in the eye, the injection should be stopped and the needle position checked. If some solution has entered the orbit, temporary loss of vision, diplopia, etc. may result but will be relieved as the anesthetic solution dissipates. Hemorrhage into the orbit however might be serious and the patient should be examined by an ophthalmologist.

4. Swelling of the tissues around the orbit. If due to the anesthetic solution it may be prevented or reduced by exerting firm digital pressure on the infraorbital ridge during injection.
5. Intradural injection. Extremely rare. It is treated as if a high spinal anesthetic occurred and is supportive in nature. Respiration and circulation may have to be maintained until the solution dissipates.

Conclusion

A number of technics for local analgesia by means of the extra-oral approach have been presented. If these methods are thoroughly understood by the anesthetist and the oral surgeon, they will be able to provide a more complete anesthesia service to the communities in which they practice.

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DENTIST'S CIVIL DEFENSE ROLE TOLD

The dentist's role as the number-two man on the civil defense casualty team was described at the Third National Dental Civil Defense Conference, an A.D.A.-sponsored event. Lt. Col. James K. Parker, chief of the department of preventive dentistry at Walter Reed Army Institute, Bethesda, Md., declared that the dentist, because of his professional training, can adjust quickly to administering many phases of medical and surgical treatment. Areas in which dentists could serve during emergencies, Col. Parker said, include establishing priority of treatment among cases, emergency surgery including tracheotomies and tying off blood vessels to arrest hemorrhage, and administering anesthesia.